

two more specimens in Travancore".

The specimen has the following characteristics: snout-vent length—35 mm; tail—73 mm. Its coloration is as follows: Dorsum with five black transverse bars. While the dark bars on the limbs are clearly visible, the forehead is devoid of the dark bar observed by Smith. No traces of gular appendage.

The specimen bearing Register Number L. 151 is deposited in the reptile collections of the Southern Regional Station of the Zoological Survey of India, Madras 600 028.

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MADRAS-600 028,
June 23, 1980.

The present record of this species from Palanis other than its type locality and nearly after a century since its description is rather interesting. We can definitely say that it is not as rare as to be restricted to the Cardamom Hills, Kerala. However, its definitive distribution should await further exploration of the Western Ghats.

I am thankful to the Officer-in-Charge, Southern Regional Station, Zoological Survey of India, Madras for facilities.

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21. GROWTH RATE OF INDIAN PYTHON, *PYTHON MOLURUS MOLURUS* (SERPENTES: BOIDAE) IN CAPTIVITY WITH SPECIAL REFERENCE TO AGE AT FIRST EGG-LAYING

(With two text-figures)

The growth rate of Indian Python from the time of hatching to the age at first egg-laying has rarely been reported. Acharjyo and Misra (1976) reported on the mating, gestation period, egg-laying, incubation, behaviour of the brooding female, hatchlings and quarterly growth rate to the age of one year of Indian Python observed at Nandankanan Biological Park, Orissa, India. They have also stated that it was intended to rear a batch of these hatchlings to sexual maturity. This communication is a follow up to these earlier observations. In this, studies on the quarterly growth rate

of 4 to 9 hatchlings of Indian Pythons from the 12th month to the age of the first egg-laying and beyond observed in the same park are reported.

Growth Rate: The quarterly growth rate of 11 to 38 Indian Python babies from the time of hatching to one year old has already been reported by Acharjyo and Misra (loc. cit.).

Our further observations on growth rate from the 12th month to the age of 51st month are as follows (Table 1, Figs. 1 & 2).

MISCELLANEOUS NOTES

TABLE 1

QUARTERLY GROWTH RATE OF YOUNG INDIAN PYTHONS FROM 12TH MONTH TO THE AGE OF 51ST MONTH

Dates	Age in months	Sample size	Mean length (Range) cm	Mean weight (Range) g
1	2	3	4	5
4 July 1975	12	11	136.41 (126.5-153)	942.91 (720-1535)
25 Sept. 1975	15	9	142.72 (127-142)	1251 (780-2330)
25 Dec. 1975	18	6	144.83 (128-179.5)	1152 (635-2170)
25 March 1976	21	5	167.60 (151-194)	1813 (1210-3005)
25 June 1976	24	5	215.50 (190-237)	4755 (2390-6640)
25 Sept. 1976	27	4	215.80 (194-240)	4378 (2250-6110)
25 Dec. 1976	30	4	218.25 (194-240)	4378 (2250-6110)
25 March 1977	33	4	219.75 (195-241)	5551 (3220-7535)
25 June 1977	36	4	233.25 (214-249)	7945 (6580-8540)
25 Sept. 1977	39	4	241.00 (220-257)	8444 (7250-8910)
25 Dec. 1977	42	4	245.75 (233-261)	8408 (7440-8870)
25 March 1978	45	4	246.75 (235-262)	9090 (7750-10,600)
27 June 1978	48	4	248.75 (235-266)	8523 (5570-10,970)
25 Sept. 1978	51	4	250.25 (236-267)	9565 (7430-10,940)

Examination of this table and the graphs reveals that the average growth rate in total length in the first year was maximum (75.70 cm) and the growth rate during the second year (44.99 cm) and third year (51.85 cm) remained almost the same. But during the fourth year the average growth rate was much reduced (15.50 cm).

The weight increase graph (Fig. 2) reveals that the maximum average growth in weight (5115 grams) was recorded during the third

year of life and the minimum average growth in weight (578 grams) was recorded in the fourth year.

Two of the (female) pythons first laid eggs in the fourth year and as usual starved for about two months during incubation.

Age at first egg-laying: Two female pythons hatched in the Park during the period from 23 to 25 June 1974 (whose matings were not observed) laid eggs on 27 April 1978 and 4 May 1978 respectively at the age of 3 years

10 months and 3-5 days and 3 years 10 months and 10-12 days respectively. Taking the gestation period as 82-83 days (Acharjyo and Misra, loc. cit.) the age of sexual maturity in these two cases can be said to be about 3 years and 7½ months.

The two females weighed 7.750 Kg (Total length 235 cm) and 8.920 Kg (Total length 250 cm) on 25 March 1978 before egg laying. These two weighed 5.570 Kg (Total length 235 cm) and 6.880 Kg (Total length 251 cm) on 27 June 1978 after the incubation was over.

The two male pythons weighed 9.090 Kg (Total length 262 cm) and 10.600 Kg (Total length 240 cm) on 25 March 1978. They weighed 10.970 Kg (Total length 266 cm) and 10.670 Kg (Total length 243 cm) on 27 June 1978. Since no mating was observed and since all the eggs were found infertile and spoiled, it is presumed that the male pythons require a longer time to reach sexual maturity than females.

Clutch size and eggs: The clutch size of one female which laid eggs on 27 April 1978 was 13 (eight normal sized white coloured eggs and five small sized light brown coloured eggs) whereas the clutch size of the other female which laid eggs on 4 May 1978 was 17 (two normal sized white coloured eggs and fifteen small sized light brown coloured eggs).

Five white coloured eggs measured 8.5-12.0×4.7-5.2 cm and weighed 165-207 grams. Five light brown coloured eggs measured 7.4-9.6×3.9-5.0 cm and weighed 73.97 g.

DISCUSSION

Deoras (1965) states that in the laboratory an Indian Python of unknown age and unstated size and weight grew 6-8 inches (15-20 cm).

Pope (1962) states that the Indian Python

holds the record growth rate of 3½ feet per year for the first two years of life. Our observations partly agrees with his observations in that maximum average growth rate in total length (75.70 cm) was recorded in the first year of life but was less than recorded by Pope (loc. cit.). This partly reflects the natural conditions under which pythons are kept with a marked winter period during which feeding was greatly reduced.

About this species Smith (1943) states that "the rate of growth in nature is not known, and the records of growth in captivity vary so greatly that they are obviously influenced by the conditions under which the snakes live". According to Grzimek (1975) the boids grow fairly quickly until they are 2-3 metres long, but after that time, growth proceeds at a much slower rate. Eight hatchlings of this species grew from an average length of 19¼ inches to 6 feet 7 inches in twenty months, a fourfold increase (Pope, loc. cit.).

Fig. 1 shows the effect of the cooler weather (monsoon quarter) on growth in length. In the year one, growth was slow in the winter quarter (October-December), picked up in the next quarter (January-March) and was maximum in summer (April-June).

The following comments on the Orissa climate are essential for proper understanding of the discussion. First quarter (January-March) winter gives way to a very brief spring followed by warm weather during February; second quarter (April-June) hot (very hot) season; third quarter (July-September) monsoon season (cooler); fourth quarter (October-December) autumn and winter, feeding much reduced.

In the second year there was marked reduction in growth in the monsoon and winter quarters and rapid growth thereafter which was marked in the monsoon quarter of the

MISCELLANEOUS NOTES

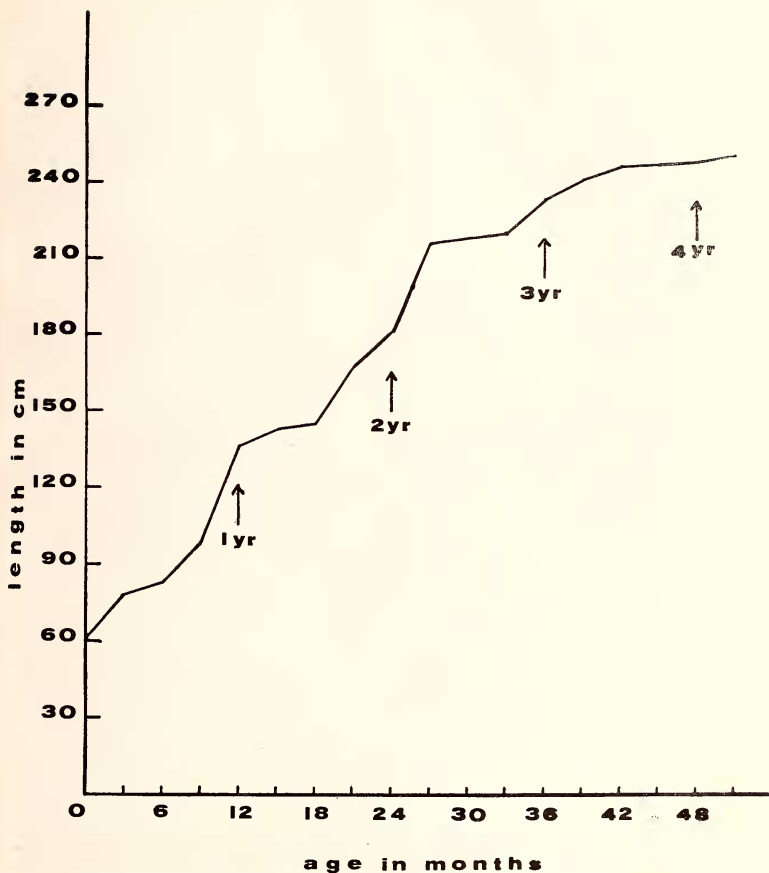


Fig. 1. Graph showing quarterly average growth rate in total length of Indian Pythons from the time of hatching to the age of 51 months (4 years and 3 months).

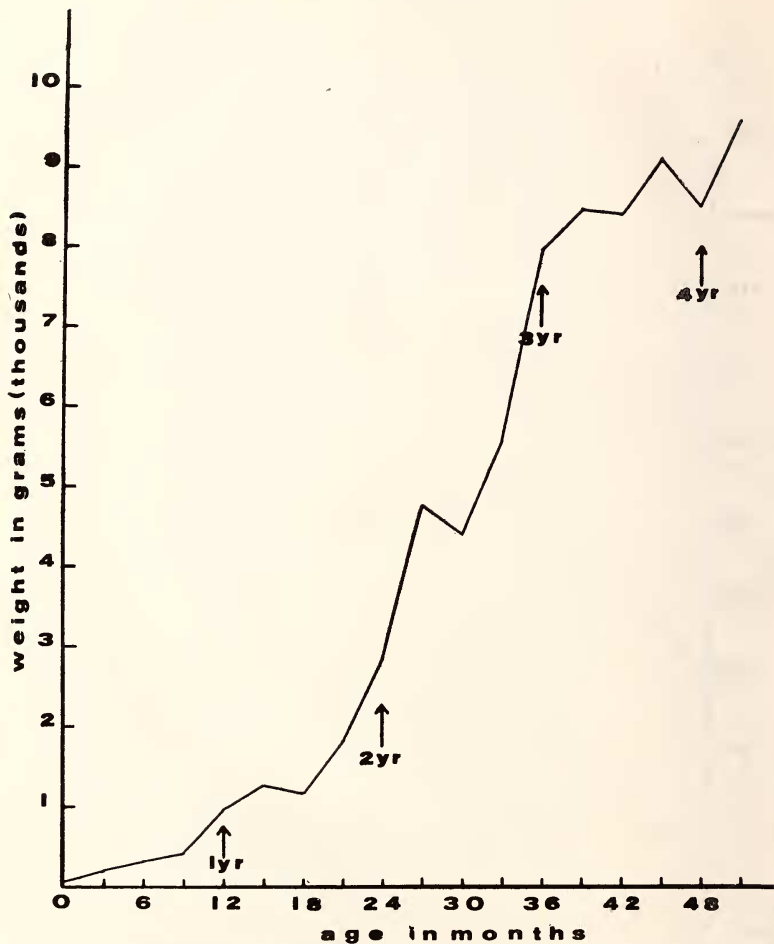


Fig. 2. Graph showing quarterly average growth rate in weight of Indian pythons from the time of hatching to the age of 51 months (4 years and 3 months).

third year. After this, growth slowed down as is to be expected with attainment of sexual maturity.

Fig. 2 shows these effect also and makes interesting comparison with Fig. 1. Marked increase in weight commenced in the third quarter of the second year at eighteen months of age and continued until the age of three years (36 months) with the sole exception of the fourth quarter (October-December) of 1976, when actual loss of weight was recorded due to cessation of feeding. Weight increase was minimum in the fourth year. This partly reflects brooding by the females but also marked reduction in growth following attainment of sexual maturity. There was a good weight increase in the third quarter of 1978 but this reflects more regaining weight lost during the fasting incubation period.

The rapid increase in length was over by 27th month of age, having commenced at sixth month, thus covering 21 months. The rapid weight increase was over at 36th month, having commenced at 18th month and thus occupying 18 months. Hence growth in length was followed subsequently by weight increase which took more time to catch up. The idea of Williamson (1967) that about half of the total length may be attained in the first 3 to 4 years of life is extremely interesting. This hypothesis receives some confirmation from Bustard's finding in the Green Sea Turtle, *Chelonia mydas* (Bustard 1972). To put this more concisely this means the maximum size of the individual depends upon early growth, the rate of which is clearly dependent upon genetic and environmental factors (Bustard, Singh and Choudhury, MS) as observed in Indian Muggur Crocodile (*Crocodylus palustris*).

It is clear that much faster growth rates than

here reported could have been achieved by winter heating resulting in greatly enhanced feeding during the winter quarters. Such growth rates would however have been much faster than occurs in nature as occurring in the Indian Crocodile (Bustard, Pers. Comm.).

Our own figures are considered to be more closely approximates natural growth being recorded out-doors under ambient temperature conditions within the natural range of the species. However they may exceed wild growth as a result of enhanced food supply. This in itself may have resulted in first egg laying at an early age than is naturally the case in nature (Bustard, Pers. Comm.).

The boids reach sexual maturity in three years in captivity (Grzimek, loc. cit.). According to Pope (loc. cit.) the smallest Indian python to produce fertile eggs was only 8 feet 6 inches (2.55 m). He further states that the female of a mated captive pair of this species laid fertile eggs at the age of less than three years.

SUMMARY

The quarterly growth rate of 4 to 11 Indian pythons from the 12th month to the age of 51st month were observed in a natural environment at Nandankanan Biological Park, Orissa, India.

The average growth rate in total length in the first year was maximum (75.70 cm) and the growth rate during the second year (44.99 cm) and third year (51.85 cm) remained almost the same. But during the fourth year growth rate was much reduced (15.50 cm). The maximum average growth in weight (5115 g) was recorded during the third year of life and the minimum average growth in weight (578 g) was recorded in the fourth year.

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22. COBRA AND LITTLE BITTERN *IXOBRYCHUS MINUTUS*

On the morning of 5th August I had the opportunity to collect a cobra (*Naja naja oxiana*) lying dead on the bank of river Tawi (360 m), with a little bittern stuck in its throat. Examination confirmed that the snake had

died in the struggle to swallow the little bittern (*Ixobrychus minutus*) which was comparatively large in size and there were no bruises or even scratches on the body of the snake.

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